



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
612 EAST LAMAR BLVD, SUITE 400  
ARLINGTON, TEXAS 76011-4125

September 14, 2009

TO: Docket File 030-14522

THROUGH: Jack E. Whitten, Chief **/RA RJT for/ 09-14-09**  
Nuclear Materials Safety Branch B

FROM: Robert Evans, CHP, PE, Senior Health Physicist **/RA/**  
Nuclear Materials Safety Branch B

SUBJECT: THE QUEEN'S MEDICAL CENTER SITE VISIT

On August 25, 2009, NRC Staff conducted a site visit of The Queen's Medical Center, an NRC-licensed hospital located in Honolulu, Hawaii. The purpose of the site visit was to observe the cyclotron, a device that produces a radionuclide that the licensee plans to license with the NRC. Attached to this Memorandum is a trip report for this site visit. No regulatory issues or safety concerns were identified during the site visit.

Docket: 030-14522  
License: 53-16533-02

Enclosure: NRC Trip Report

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Publicly Avail.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Sensitive Value:		
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09/11/09	09/14/09			

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**NRC Trip Report**

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket No.: 030-14522

License No.: 53-16533-02

Report No.: None

Licensee: The Queen's Medical Center

Facility: Liholiho Cyclotron Laboratory

Location: 1301 Punchbowl Street  
Honolulu, Hawaii

Date: August 25, 2009

Inspector: Robert Evans, PE, CHP, Senior Health Physicist  
Nuclear Materials Safety Branch B

Accompanied By: Jack E. Whitten, Chief  
Nuclear Materials Safety Branch B

Approved By: Jack E. Whitten, Chief  
Nuclear Materials Safety Branch B

Attachment: None

ENCLOSURE

## NRC Trip Report

### **Background**

The Energy Policy Act of 2005 gave the NRC regulatory authority over naturally occurring and accelerator-produced radioactive materials (NARM). While developing the regulatory framework, the NRC issued a waiver to licensees on August 31, 2005, which allowed continued use and possession of NARM. The NRC terminated the waiver in phases. The final phase, which includes the State of Hawaii, was terminated on August 7, 2009 (74 FR 5797). As a result of the termination of the waiver, The Queen's Medical Center is expected to submit an application to the NRC for use of the cyclotron to produce radiopharmaceuticals and to distribute these radiopharmaceuticals to other licensed entities. The licensee has until August 2010 to submit the application.

### **Site Status**

The Queen's Medical Center cyclotron is used to produce flourine-18 (F-18) for use in positron emission tomography (PET) imaging studies. The radionuclide F-18 has a 110-minute half life and a 511-kev photon. The production process consists of bombarding 1.2 milliliters of water containing oxygen-18 isotopes with protons created by the cyclotron. The oxygen-18 is converted to F-18 which eventually decays back to oxygen-18. The production process produces about 1.8 curies of F-18 per cycle. The licensee then creates unit doses of about 10 millicuries for use in PET imaging studies. A "rabbit tube" pneumatic delivery system is used to transfer the radioactive material in canisters from the cyclotron room to the PET imaging room. The licensee's representative stated that the hospital produced F-18 radiopharmaceuticals on a daily basis.

The NRC staff toured the Liholiho Cyclotron Laboratory with the licensee's radiation safety officer (RSO). Three individuals were assigned to operate the cyclotron, two nuclear medicine technicians and a cyclotron engineer. The site staff described the facility and how unit doses were created.

The NRC staff briefly reviewed the occupational exposure records for licensee staff who handled the F-18 material. According to records and interviews, whole body doses were about 0.3 to 0.4 rems per year with a regulatory limit of 5.0 rems per year. Extremity doses were about 12-15 rems per year with a 50 rem per year limit.

The NRC staff also toured the area where PET imaging occurred. The on-duty PET imaging technician stated that approximately 7-8 studies were conducted each day. The NRC staff reviewed the doses of the PET imaging technicians and noted that their doses were a little lower than the doses to the nuclear medicine technicians.

During the site tour, the RSO stated that the new license application for the F-18 to be produced by the cyclotron was forthcoming and may be submitted to the NRC within a few weeks. The application apparently will include a request for commercial distribution of F-18 radiopharmaceuticals to other licensees.

Following the tour of the cyclotron, the NRC staff toured other areas of the hospital where the licensee used and stored radioactive materials. These other areas included the nuclear medicine department, storage rooms, and linear accelerators.

**Officials Contacted**

Brian Oyadomari, RSO  
Russ Takata, Manager, Hawaii Department of Health

Figure: The Queen's Medical Center cyclotron

